

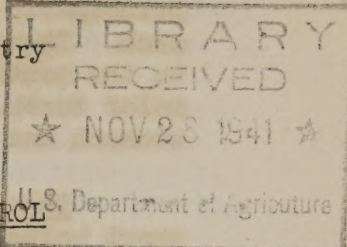
1.913
E3H78
Reserve

to cut.

UNITED STATES DEPARTMENT OF AGRICULTURE

Extension Service

In cooperation with the Bureau of Entomology
and Plant Quarantine and Bureau of Animal Industry



HORSE BOTFLIES AND SUGGESTIONS FOR ORGANIZED CONTROL

By M. P. Jones, Senior Extension Entomologist
and
C. D. Lowe, Senior Extension Animal Husbandman

A practical knowledge of horse botflies is essential to the control of these parasites. Botflies or "nitflies" annoy horses, mules, and asses during the summer and in the larvae or maggot stage are the well-known bots that infest these animals. Extension workers, horse owners, and others interested in organized movements to treat all equine stock in any selected area in order to destroy bots will find useful the condensed information here outlined.

THREE SPECIES OF BOTFLIES

The table and chart appearing on the last pages present the main points in the life cycle of the three important species of botflies which are known to be present in the United States. The common botfly and chin botfly are found in almost all States. The nose botfly is confined at present to the Rocky Mountain, Northwestern, and Central States, but is spreading. All three species of botflies make their appearance during the warm periods of spring, summer, and fall, during which time they are active in depositing eggs on the hair of certain parts of the body of horses. The adult flies of all three species are very much alike in appearance and somewhat resemble honeybees. However, they have only one pair of wings and the abdomen is curved under. This forward curve in the abdomen aids in depositing eggs.

Eggs and Small Larvae

The common botfly. Eggs of the common botfly are deposited principally on the forelegs. After 6 or 7 days of warm weather the tiny bots are ready to leave the eggs. The small bots wait within the eggshell until they feel the warmth of the horse's lips when pressed against them. Feeling the sudden warmth from the lips, they burst open the eggshells and crawl onto the lips and into the mouth and burrow into and along the upper surface of the tongue. After 3 to 4 weeks they leave the tongue and pass to the stomach.

The throat botfly. The eggs of the throat botfly are laid principally along the under side of the jaw between the chin and the neck. These eggs hatch in about 5 days and the tiny bots crawl at once to the mouth, where they are found principally around the gums of the molar teeth. After 3 to 4 weeks they pass through the esophagus and stomach and attach in the duodenum.

The nose botfly. The eggs of the nose botfly are laid on the short hairs along the edges of the lips. They hatch in about 2 days and the tiny bots burrow at once into the lining of the lips and continue their burrowing in the mouth for a few weeks. The lips are greatly irritated by the burrowing. Later these nose bots pass to the stomach.

Full-Grown Larvae and Pupae

Full-grown bots pass out of the horse with the manure, mostly in the summer time, and undergo a pupal stage lasting from 3 weeks to over 2 months on or in the ground. If exposed to freezing while in the ground many of the bots probably are destroyed.

CONTROL

Horses not treated may suffer from bot infestation during any period of the year because many of the grown bots do not pass from the intestinal tract before the small ones begin to appear.

After the first killing frosts botflies are no longer active. Then, in 3 to 4 weeks, the young throat bots and nose bots will have left the tissues of the mouth. No unhatched eggs of these species remain.

In the case of the common bots, however, many of them remain in the eggshells for several weeks, some even for several months. The horse has the habit of rubbing the lips against the forelegs and when this happens the tiny bots hatch and crawl onto the lips. It has been determined that the sudden warming is all that is required to make the little bots or larvae break out of the eggshells. By recent experiments it has been shown that solutions of carbolic acid or of coal-tar dips do not kill these larvae still in the eggshells.

Warm Water Wash for Common Bot Eggs

It has been found that during cool weather in the fall when these tiny bots waiting in the eggshells are suddenly warmed with warm water they burst out of the eggshells instantly. Once out of the eggshells they soon die from exposure to the air. The simplest method for eliminating these larvae is to apply warm water vigorously to them with a rag or sponge. The water should be at about 105° F., for best results. It is advisable to use a thermometer.

This washing of the eggs should not be undertaken until about 2 weeks after killing frosts have ended botfly activity, thus giving the eggs time during cool weather for incubation. Four weeks should elapse after the washing of the legs before treating for bots internally in order to permit time for the bots to leave the tongue of the animal. Thus for a most thorough effect the fumigation of the stomach should not be undertaken before December 1 in the Northern States. For practical purposes, however, November 1 is regarded as a satisfactory date for forcing the eggs to hatch. Then allowing 2 or 3 weeks for the larvae to leave the tongue, the stomach can be purged about November 15 or later.

Farther south, where botfly activity extends on into December and begins again in March or April, the most practical procedure is to give the internal treatment twice, once in September and again in January or February.

Medical Treatment

Fast animals before internal medication. Satisfactory results cannot be obtained if the animal's stomach is not empty. During the 18 hours immediately preceding the internal treatment, all food and water must be kept from the animals if the treatment is to be the most effective. Bedding or any other material which the animals can eat must be kept out of reach of the fasting animals.

Internal medication with carbon disulfide. While the bots are in the empty stomach of the animals they can be killed with carbon disulfide. Treatment administered during December, January, or February is most effective. By treating earlier there is a possibility of reinfestation from eggs delayed in hatching. If the animals are treated after February some of the bots will have moved and attached themselves farther back in the intestine where they may not be killed.

Carbon disulfide is administered by capsule or stomach tube after the fast. The dose is 6 fluid drams for a 1,000-pound animal. When carbon disulfide capsules are used they should be fresh to insure proper dosage because evaporation of the material will take place through the capsule. Many kinds are available but those containing liquid are preferred over the mass capsules, and the soft flexible capsules are preferable to the harder ones.

The carbon disulfide treatment for horse bots is about 100 percent effective and is equally effective in removing the large intestinal roundworm. With some modification, it is highly effective in destroying certain kinds of stomach worms. All these parasites are widespread and do serious injury to colts and older horses, mules, and asses. The use of oil, laxatives, or purgatives of any kind, in combination with or following the administration of carbon disulfide, is likely to be detrimental.

Carbon disulfide is a volatile, inflammable liquid. Its use by the uninformed or careless person is hazardous. Therefore this treatment should be administered by a veterinarian, who by training and experience is best qualified to make a diagnosis and to exercise all necessary precautions in carrying out the treatment.

Botfly Protectors

Many kinds of gadgets have been used to protect animals from adult botflies. The greatest value of such devices has been in preventing annoyance to the animals rather than in effecting any appreciable control of the horse bots. A piece of belting attached by snaps to the bit rings is cheap and gives considerable protection from the annoyance of the adult nose botflies.

COMMUNITY ACTION LEADS TO BEST RESULTS

The treatment of horses, mules, and asses on a single farm usually gives good returns in improved condition of the stock and reduces annoyance from botflies, but control efforts over a considerable area are much more effective. Such area work is now under way in many places and is yielding satisfactory results. Botflies may be completely eliminated from a given area by persistent effort.

Conditions vary from State to State, which makes a blanket program difficult to prepare in detail. However, the following outline suggests the major points to consider in organizing a control campaign. Literature covering the subject of parasites and parasitic diseases of horses may be obtained through your State college of Agriculture or from the United States Department of Agriculture, Washington, D. C. Farmers' Bulletin 1503, The Horse Bots and their Control, is free on request.

Organized bot-control campaigns on an area basis are much more effective and yield more lasting results than the treatment of animals on a single farm in a community. If an entire county is covered in an operating unit and a number of counties combined in a block for intensive work, excellent results will be obtained. Such procedure cuts down the animal-unit cost of the treatment, saves time, and otherwise makes for economy and efficiency.

Ample evidence has been gathered to indicate that the average horse, from which the bots have been eliminated, lives longer, produces more power, has less colic, requires less feed, and is easier and safer to handle than the untreated animal.

The group basis of organizing and conducting a campaign requires the cooperation of the horse owners, the practicing veterinarian or veterinarians in the area, local leaders, the county agricultural agent, and the extension subject-matter specialists of the State college such as those in entomology, veterinary medicine, horse husbandry, etc. In

some instances 4-H Club members and Future Farmers have given excellent assistance in distributing notices, in gathering reports, and so forth.

Suggestions for a Bot-Control Campaign

The following campaign set-up and procedures have been used with good results in some States. This plan may be modified to meet such conditions as exist in different States or local areas.

1. Consult practicing veterinarians located in the area and determine if they will cooperate in a bot-control campaign. If so, get estimates of charges for their services, and discuss plans for participation. All this may be done at a special meeting of such veterinarians if there are several in the county.

2. Provide the county agricultural agent with material for use in local papers, for mailing and for other distribution. Such information should emphasize the losses due to bot infestation, that effective methods of treatment are available, and the results obtained in areas where campaigns have been conducted. Attention should also be given to the fact that the first step in a control program is the washing of the nits from the legs and other parts of the animal's body with warm water 30 days before the internal treatment is given.

3. A county-wide meeting of horse owners may be held, but usually community or district meetings are preferable. Such meetings should be of informational character where subject-matter discussions are conducted and specimens, charts, and pictures used to put across messages. The details of organizing and conducting the campaign should also be presented. At the close of such meetings, if they accomplish their purpose, local leaders (usually one to each school district or township) are selected. Such leaders are expected to get the farmers in each district to bring their animals to some central point or points for treatment or arrange to have them assembled on their own farms or at designated key locations on certain roads for convenience in administering treatment.

4. Arrange with veterinarians to have ample supplies of carbon disulfide.

5. Set dates and arrange schedules of veterinarians for treatment.

6. Arrange with local leaders to have necessary help at treatment points.

7. Release the complete tour schedule with approximate time table.

8. Arrange for necessary follow-up work such as reports from cooperators on bots and worms passed by animals after treatment,

condition of stock following treatment, and extent of annoyance from bot-flies during the following season. Plans for conducting another campaign the following year should also be made.

Suggested Agreement Form

(For use by community leader in conducting sign-up)

The horse owners whose names appear below agree to cooperate in a bot-control campaign to be carried on in _____ County under the general direction of the Agricultural Extension Service, with the professional assistance of practicing veterinarians, local leaders, and others.

It is understood that the veterinarians will furnish and administer the carbon-disulfide treatment at a cost of _____ per head. The horse owners agree to have their horses assembled and ready for treatment at the time and place indicated by the community leader of the campaign. This shall include a fasting period prior to treatment.

The horse owners also agree to assist the veterinarian in handling the stock at time of treatment, and to furnish reports to the community leader on results of the work, and any necessary follow-up.

The county agricultural agent agrees to give assistance in organizing and supervising the campaign in order to make it as effective and complete as possible, and to assemble reports from community leaders and transmit them to the project leader or leaders at the State college.

Community leaders agree to enroll horse owners for participation in the campaign, assist in its operation, and act as contact persons between the farmers in the community and the veterinarian and the county agricultural agent.

The following horse owners agree to have all their horse stock treated in the cooperative bot-control campaign to be conducted in _____ County this season.

<u>Name</u>	<u>Address</u>	<u>Location of Farm</u>	Number of horses, mules, and burros
-------------	----------------	-------------------------	--

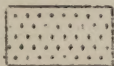
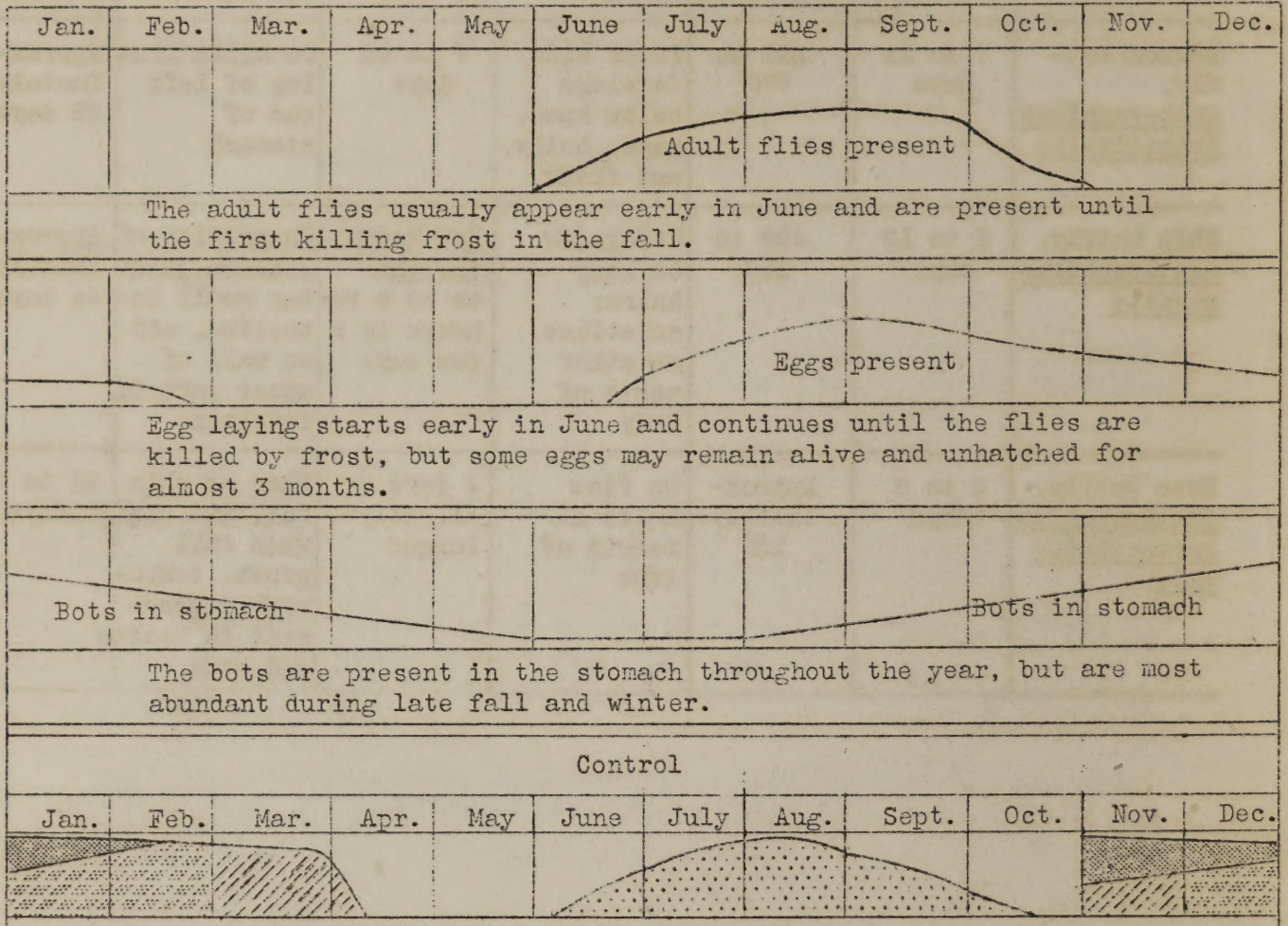
FACTS REGARDING THE LIFE AND HABITS OF HORSE BOTFLIES

Species of fly	Length of life of adult fly	Number of eggs deposited	Location of eggs	Period of incubation of eggs	Location of bot in horse	Pupation period in ground
Common botfly, <u>Gasterophilus intestinalis</u>	7 to 21 days	397 to 770	Inner side forelegs below knee, mane, belly, and flank	7 to 96 days	On white lining of left sac of stomach	Approximately 38 days
Chin botfly, <u>Gasterophilus nasalis</u> (small) Three	3 to 12 days	480 to 518	Under jaw on long hairs; sometimes on other parts of body	Not known; thought to be a few hours to a few days	On portion of stomach joining small intestine, and on wall of upper part of intestine	Approximately 44 days
Nose botfly, <u>Gasterophilus haemorrhoidalis</u>	3 to 6 days	Approximately 150	On fine hairs at margin of lips	5 days or slightly longer	Same as chin bot, and also, when full grown, temporary attachment to rectum and anus	21 to 68 days

SUMMARY OF LIFE CYCLE AND CONTROL OF HORSE BOTS THROUGHOUT THE SEASON

It is impossible to make a chart which will suit the conditions every season or for the whole United States, but in a general way this gives the situation in the West Central States.

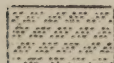
Life Cycle



Time of year when nose flies are present and when nose protectors can be used to advantage.



Presence of live eggs after flies are dead. These eggs should be destroyed by applying warm water (105° F.) 30 days before treatment with carbon disulfide..



This is the best time to treat for bots with carbon disulfide.



The less desirable time to treat but better than no treatment.